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HYDRO POWER AND ENERGY
PLANNING PROJECT (HPEP)

Balancing Market

August 2014

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GEORGIAN BALANCING MARKET

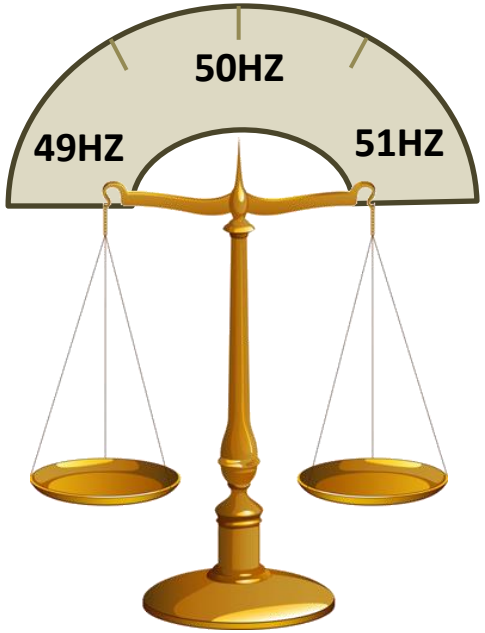
- Georgia is moving toward competitive electricity market
- Electricity Trading Mechanism
- Daily Trading by Sep. 2015
- Moving away from a centralized control
- Involvement of market participants to a much greater degree;
- Making use of newly developed day ahead planning (DAP) processes;
- Transitioning to hourly settlement from monthly settlement;
- Introducing a balancing process that includes price signals

BALANCE ENERGY

Definition:

"Volume of electricity required for each billing unit to balance the difference between effective delivery according to metered values and the delivery, according the schedule for a particular time unit in order to create zero balance billing unit for the control area"

Electricity Consumption



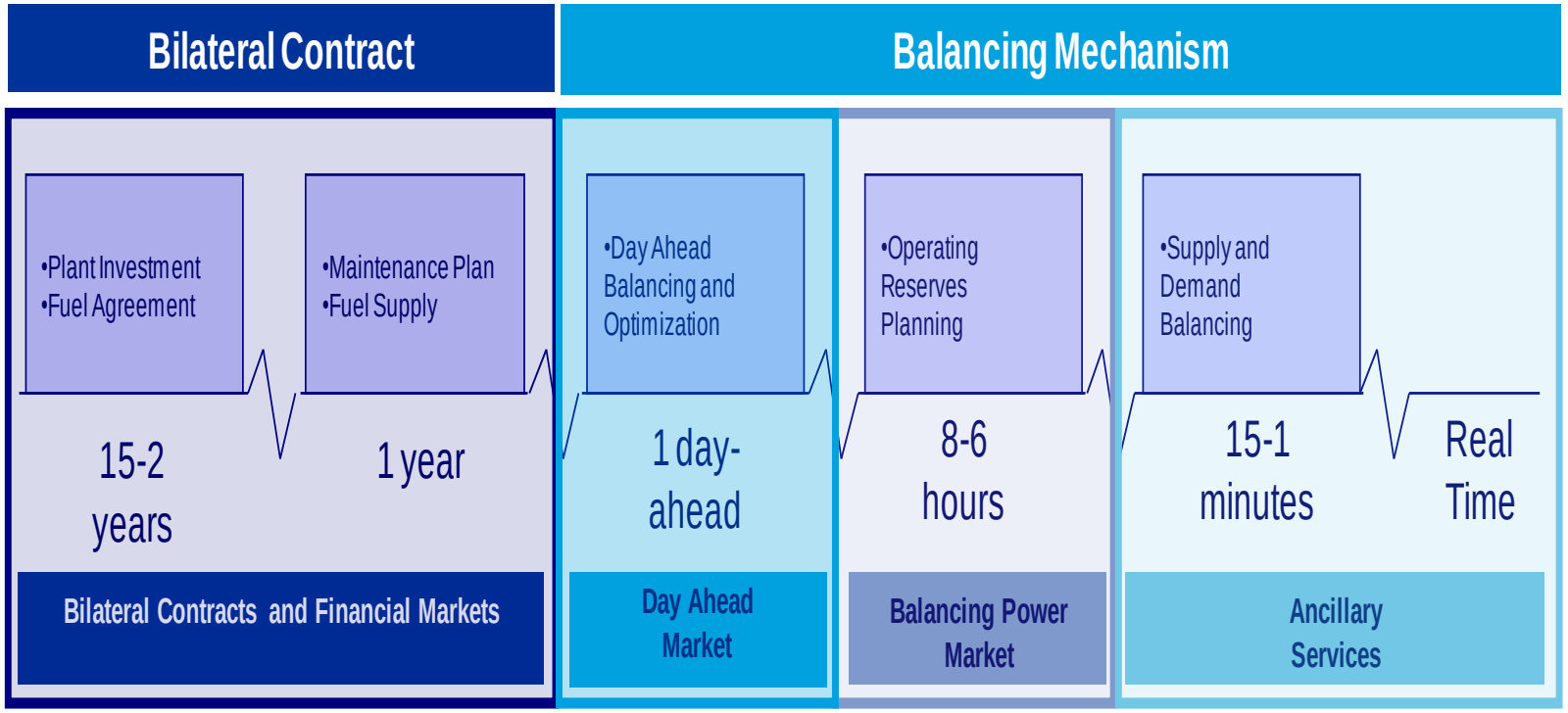
Electricity Production

BALANCING MARKET

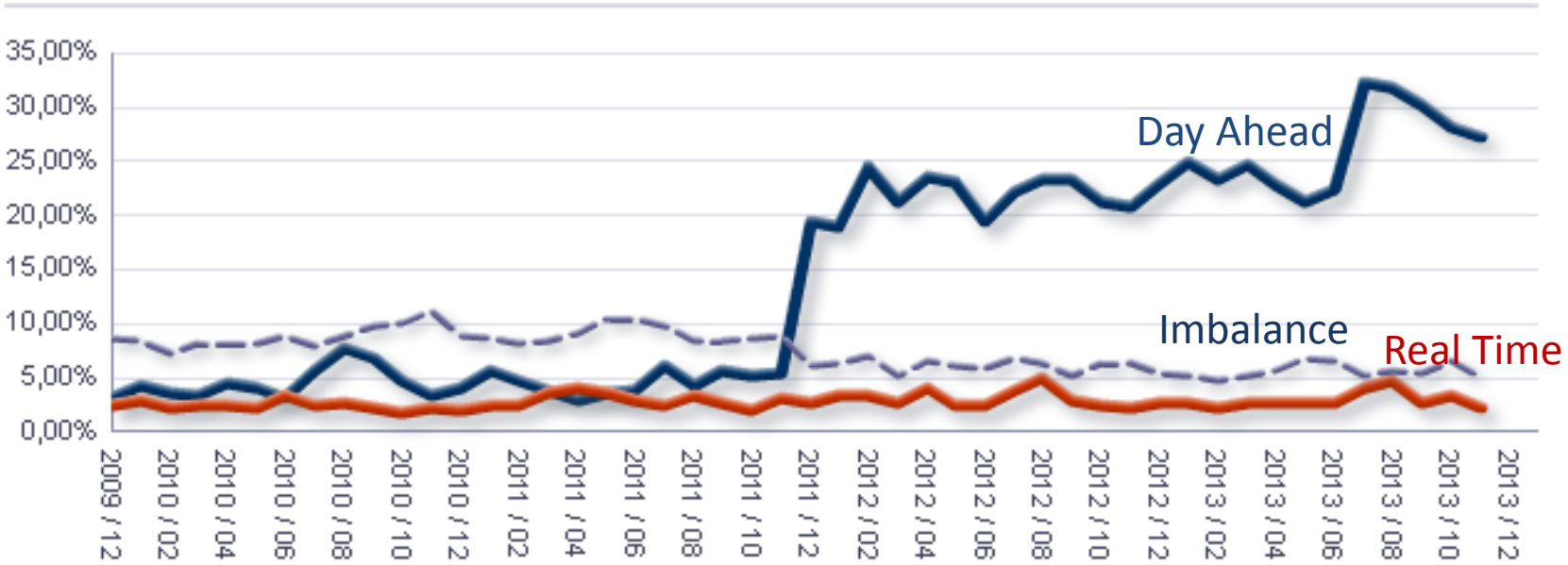
Planned Supply A	Actual Supply B	Contract Volume C	Foreseen Energy Imbalance D = A - C	TSO Instructed Deviation E	Uninstructed Deviation F= B – (A+E)	TSO Instructed Energy Imbalance G = D + E	Actual Energy Imbalance H = B - C
120	115	70	50	-10	5	40	45

- TSO instructed Energy Balancing – 50MW
- TSO instructed Deviation (Up/Down regulation) – 10MW
- Uninstructed Deviation – 5MW

TURKISH POWER MARKET



BALANCING MECHANISM IN TURKEY



CHALLENGES

- Transition without risking significant rate increases;
- Build forecasting and day-ahead scheduling skills;
- Maintain ratepayer the benefits of low cost regulated hydropower plants in a market environment;
- How to encourage a MPs to aim for a balanced position

CHALLENGES

- Establish appropriate incentives and penalties to encourage MPs to meet their obligations in the balancing market;
- How to take into account very different seasonal balancing characteristics
- How to handle the task of modifying existing bilateral contracts to reflect hourly volume commitments;
- Development of rules and procedures;
- IT development/software acquisition;
- Regulation and monitoring requirements.

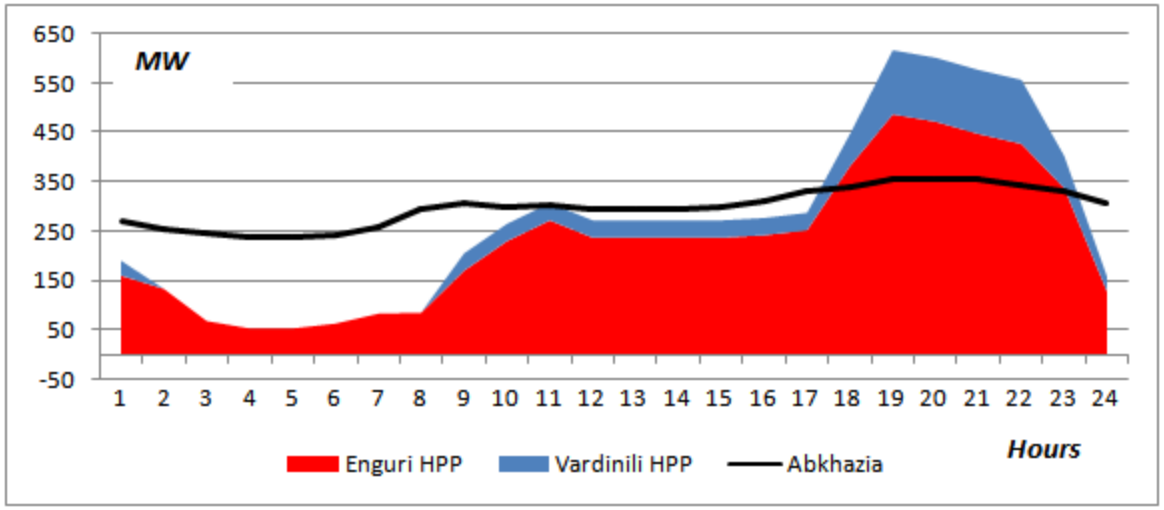
BALANCING PRICING

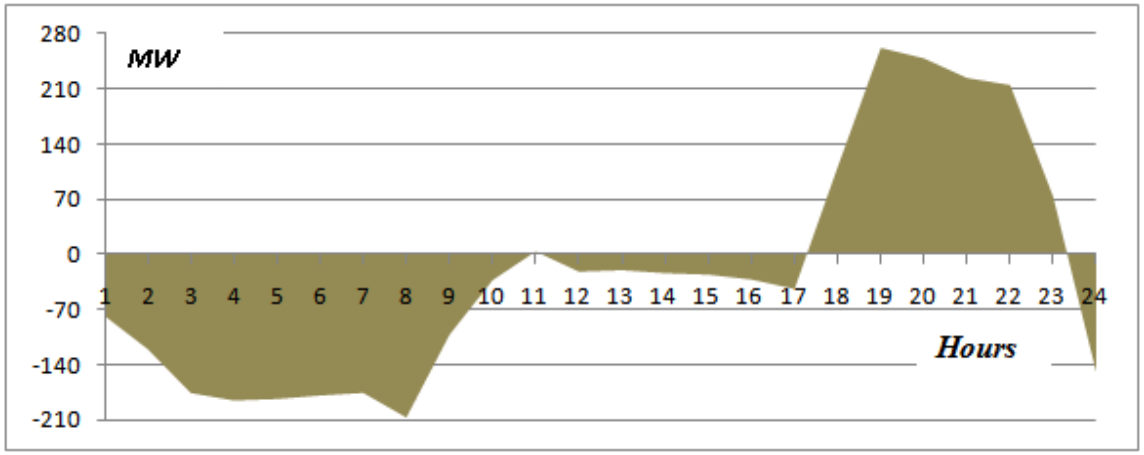
- At first stage AWT should be used
- GNERDC approved Tariffs , small uplift could be used to provide incentives to generators.
- Partial Pool off-takers selling price should be the same in BM..
- Abkhazia factor should be considered – 2 options
- The suggested approaches to pricing mentioned in this report can be adjusted in result of simulations which should be started as soon as possible.

ABKHAZIA SUBSIDIES

Enguri HPP annual generation in GWh	3600
Annual flow to Abkhazia (2013) in GWh	1605
Georgian domestic consumption (2013) in GWh	8085
Approved Enguri HPP tariff in $/MWh	7
Annual costs for Enguri HPP in $M	13.965
Required tariff for Enguri HPP without subsidies in $/MWh	3.88
Subsidy in $M	6.24
Domestic tariff subsidy in $/MWh	0.77

ENGURI GENERATION VS ABKHAZIA





OPTIONS FOR OFFSETTING UNPAID FLOW TO ABKHAZIA

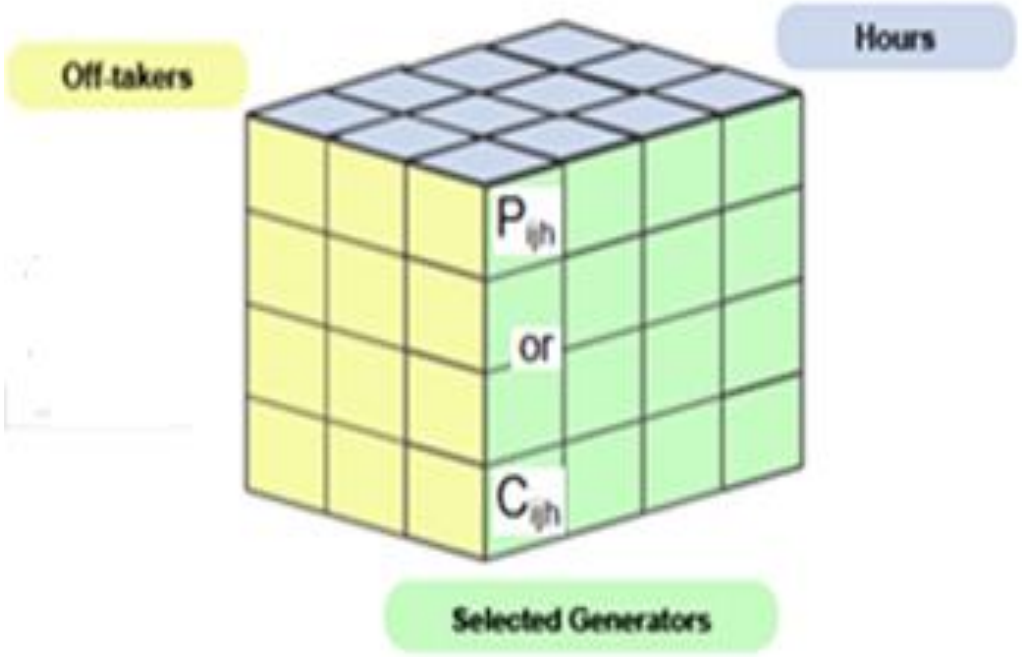
1) Subsidies would be carried out by balancing market participants only

2) Subsidies are divided into two parts:
   I. Is covered by participants active on bilateral contracting market
   II. through the balancing market participants.

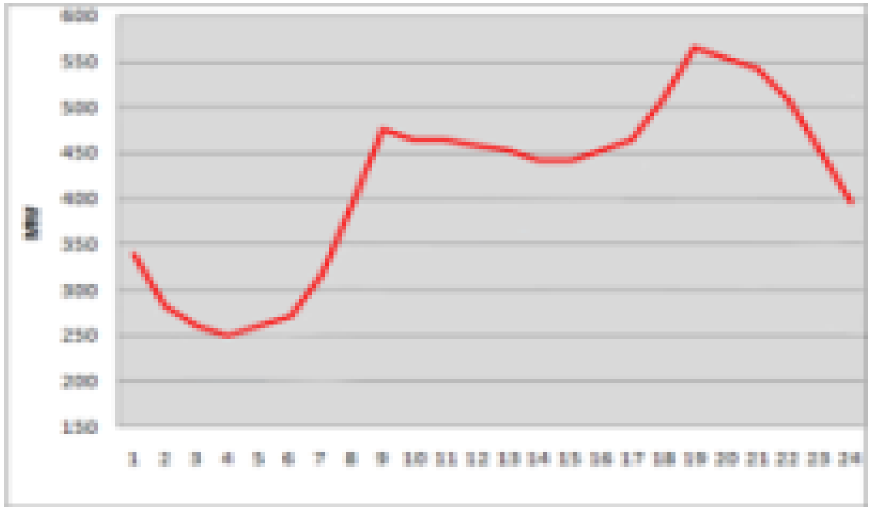
BILATERAL CONTRACT PRICING

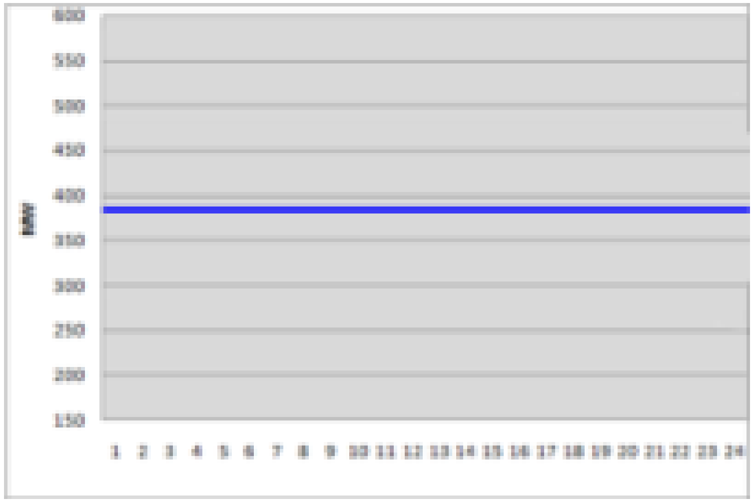
- Partial pool (PP) on monthly basis;
- Based on MPs' free negotiations on monthly basis;
- Daily agreements;

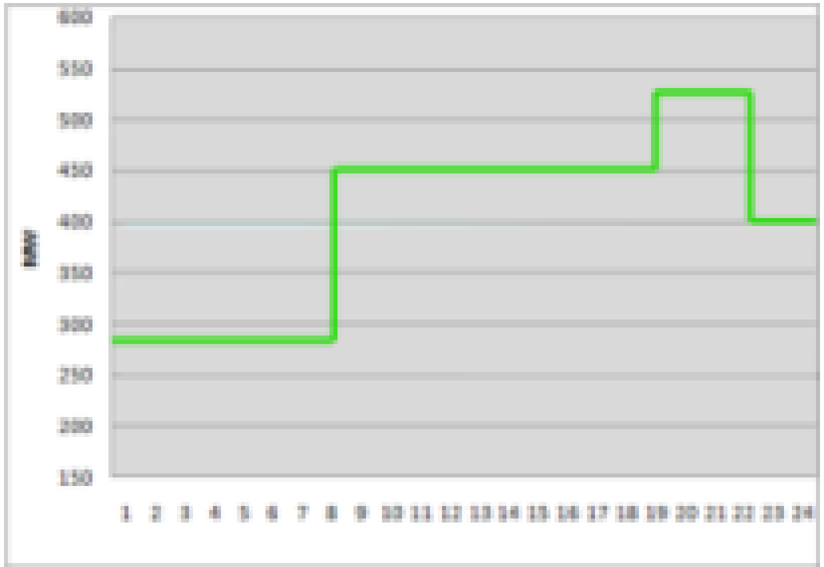
PARTIAL POOL



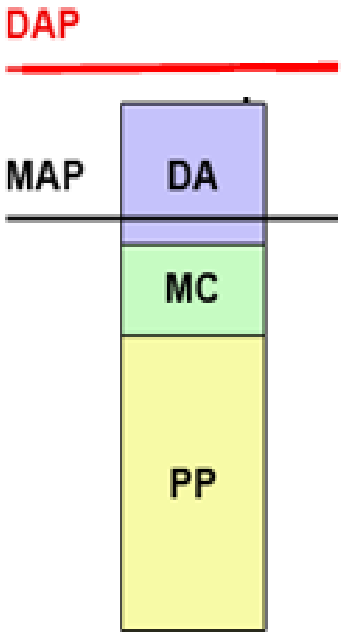
MONTHLY BILATERAL FREE CONTRACTS





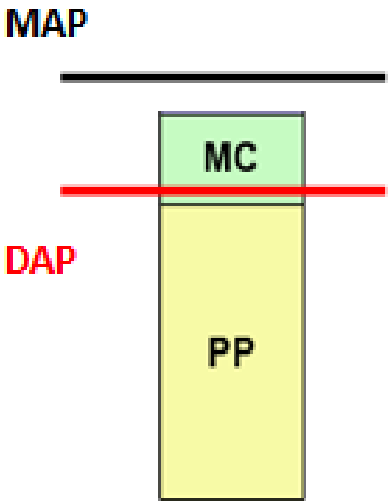


DAILY CONTRACTS



MAP – Month Ahead Planning

DAP – Day Ahead Planning



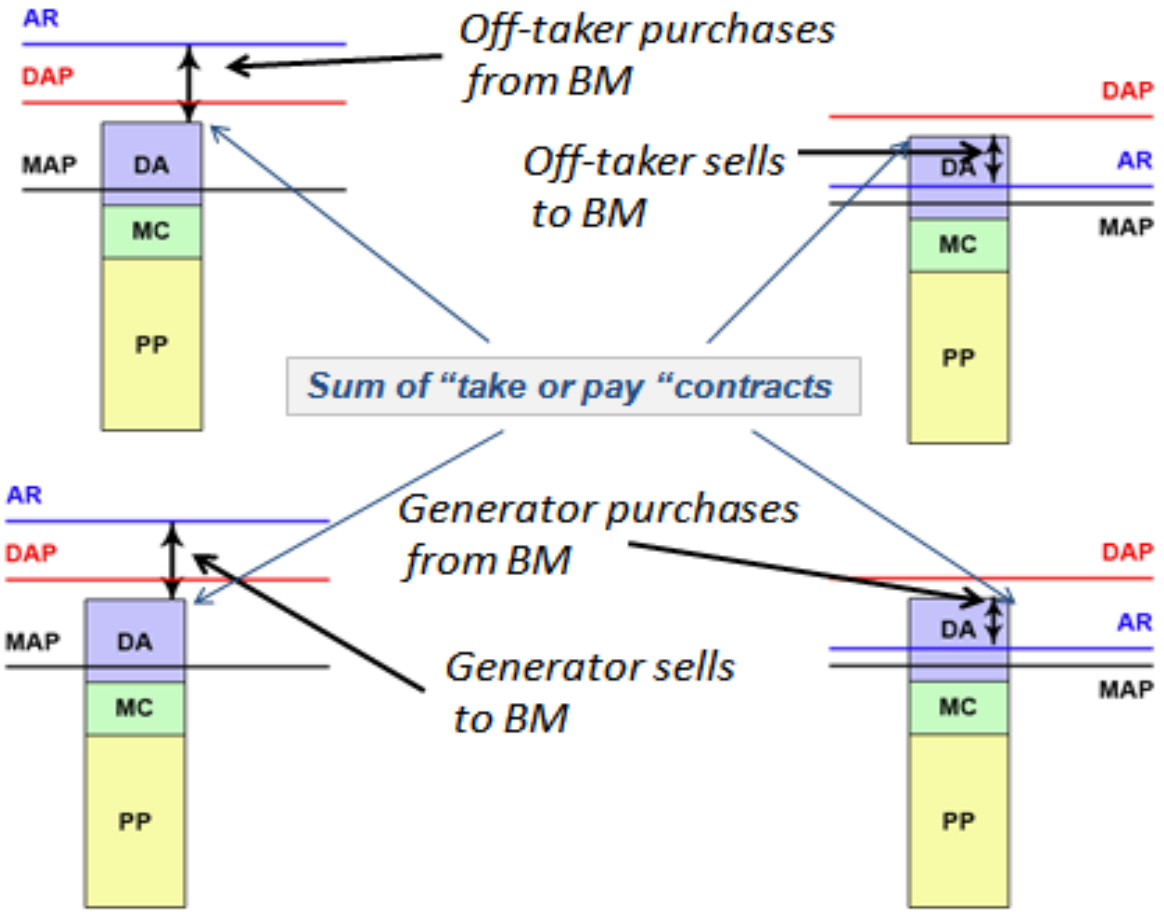
PP – partial pool contracts

MC – monthly contracts based on free negotiations

DA – daily agreements

Option1. Daily agreements MP-MP
Option 2. Daily agreements MP-Trader
Option 3. Daily full pool.

TAKE OR PAY CONTRACTS



MAP – Month Ahead Planning

DAP – Day Ahead Planning

AR – actual regime

PP – partial pool contracts

MC – monthly contracts based on free negotiations

DA – daily agreements

RECOMMENDATIONS

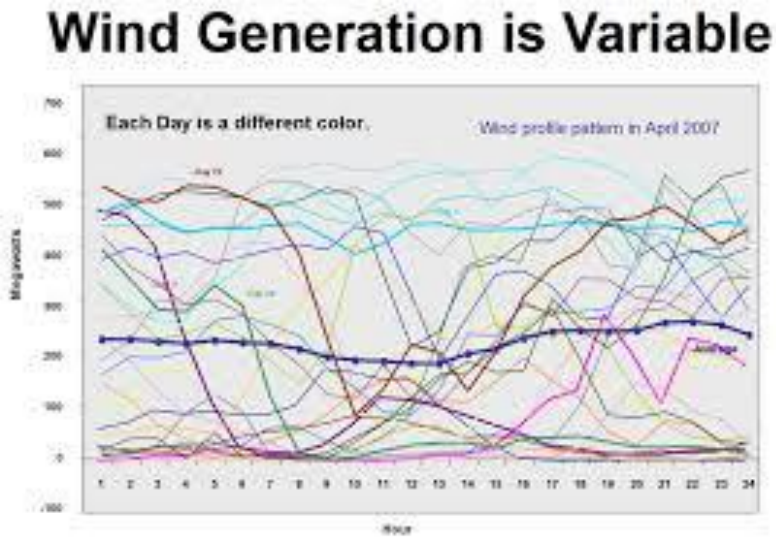
- MoE led Working Group
- Hourly balancing settlement should be incorporated in the balancing mechanism.
- Generators receive the energy balancing price for such balancing energy as the TSO instructs to produce
- Uninstructed deviation +/- dead band range of the greater of 2 MW or 3%, and a discount for over generation outside the dead band of 20% of the balancing price and a premium for under generation of 20% of the balancing price
- Allow imports from Turkey for balancing

RESPONSIBILITIES ON BALANCING

- Balancing – ESCO, Invoicing ESCO
- Real Time Balancing – GSE, Invoicing ESCO
- Imbalances- GSE, Invoicing - ESCO

BALANCING GROUPS

- A set of buyers and sellers under a BRP Agreement
- Hourly nominations are submitted by all members to the MO and TSO
- Meters readings are netted by hour



BALANCING RESPONSIBLE PARTIES

- Offers their service to buyers and sellers
- Creates a balancing group
- Administer imbalance service:
  - invoice and payment to MO or TSO
  - Allocation of payments by hour to BGs members
  - Collects fees to cover payments and admin fee

CHALLENGES

Legal challenges:

- Independence of the Regulator,
- Transparency of the process
- Unbundling
- Creation of TSO and MO
- Clearing and settlement
- Supplier switching process

Technical challenges:

- Gate closure times
- Market time unit – 1 hour vs 15 minutes
- Imbalance pricing and settlement
- Balance responsibility and defining the BRP
- Mandatory participation
- Reserve capacity determination and nomination of providers of reserve capacity
- Treatment of losses and ancillary services market

THANK YOU

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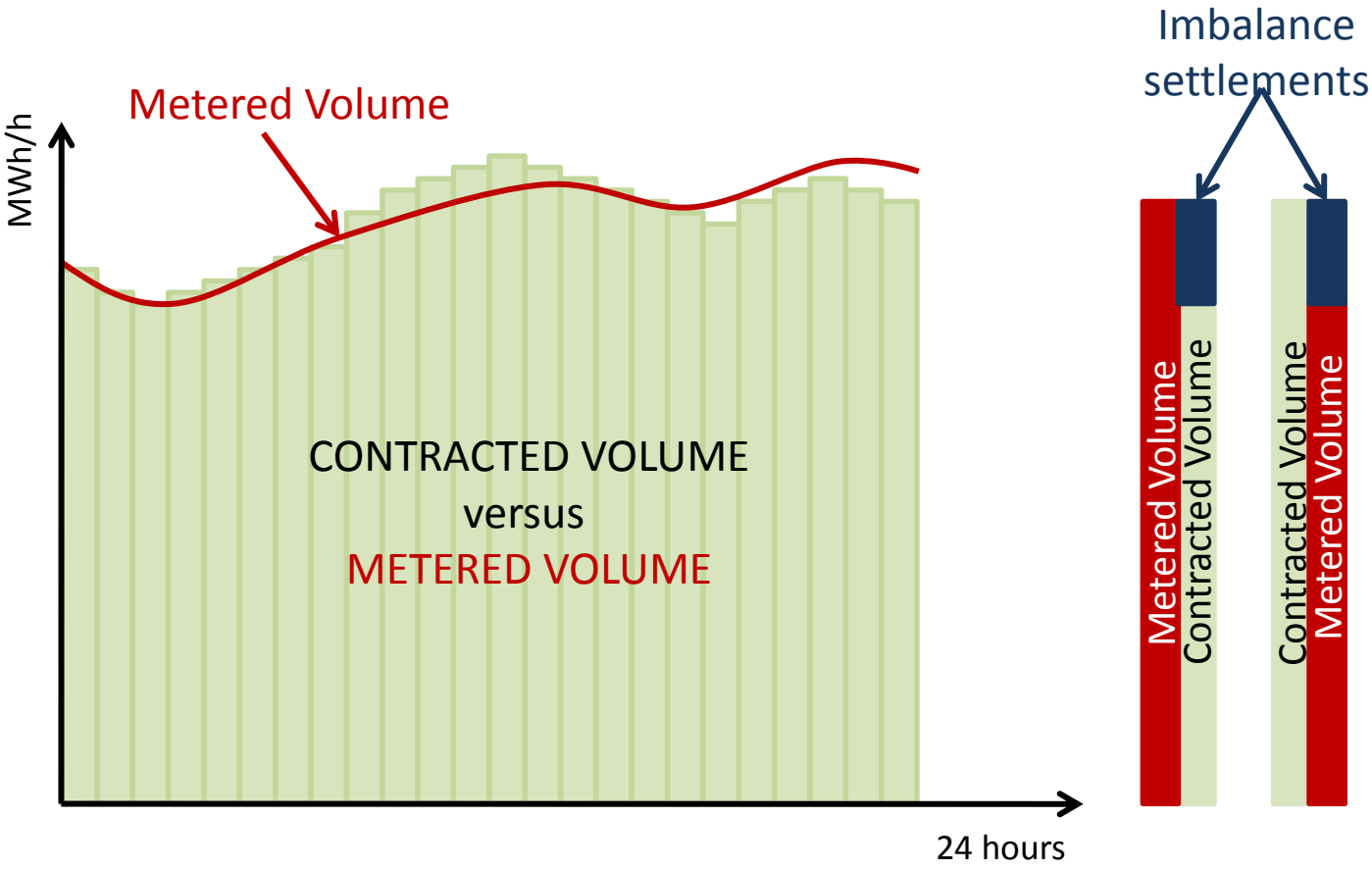
Balancing Groups

- Definition of Balancing Group:

"Virtual group of suppliers and customers within which the amounts of electric energy procured and supplied are balanced"

- The Balance Group is a commercial unification of consumers and producers within a Control Area.
- The Balance Group Representative represents the balance group in its dealing with other market players.
- National legislation is defining the obligations for participation in the balancing groups.
- In some countries participation in balancing groups is mandatory and every market participant (consumer, producer, supplier, trader) must be member of a Balance Group that is registrated in the control area.
- The balancing regulations defining the market timing units from 15 minutes to 1 hour.
- In some countries it requires Balance Group to create in every 15 minutes a balance between production and consumption of electricity.
- The discrepancy of this balance is calculated as the balance energy.

IMBALANCE SETTLEMENTS



ROLE OF THE CLEARING AND SETTLEMENT AGENT

- The Clearing & Settlement Agent has a very important role in the system
- The Clearing & Settlement Agent is the „key player“ between the Management of the Control Area and the Balance Group Representatives
- The Clearing & Settlement Agent is a company which is NOT an electricity company
- In Austria the the Clearing & Settlement Agent is a joint-stock company.
- Stock is held by several electricity companies, banks, the Stock Exchange, IT company, which avoids dominant influence of one shareholder/owner.

ROMANIAN BALANCING GROUP MODEL

- According to the Romanian Commercial Code the **TSO is responsible** for balancing. The TSO also acts as Balancing Market Operator, responsible for:
- Balancing energy is provided via auctions for which pay as bid is used for price determination.
- All generators have the obligation to participate in the central balancing market that includes all Balancing Responsible Parties consisting of dispatchable units of producers and suppliers of consumers.
- According ANRE order No. 36/2005 Balancing Responsible Parties may form a balancing group if:
  - forecast of annual production does not exceed 30% of net injected electricity of the previous year
  - forecast for annual consumption does not exceeds 30% of net consumption of the previous year

HUNGARIAN BALANCING GROUP MODEL

- The balancing market is operated by the TSO.
- Participation is mandatory for all Electricity Traders:
  - either directly (by concluding an agreement with the TSO)
  - becoming a member of a balancing group and assigning the balancing obligation to a balancing party.
- Non-domestic Electricity Traders tend to manage their balancing obligation and enter directly into a balancing agreement with the TSO.
- The balancing market is regulated in detail by both the Electricity Act 2007 and the Commercial Code of the TSO.
- The balancing party must deposit a financial guarantee with the TSO to ensure the safe settlement of the transactions.
- The basis of the financial guarantee is the amount paid to the TSO on average for the three preceding settlement periods.

SLOVENIAN BALANCING GROUP MODEL

- According to Slovenian legislation the TSO (ELES) is responsible for balancing.
- Market Operator operates the Balancing Marked.
- The market organization is based on balancing groups.
- According to the Slovenian Market Rules a balancing party failing to fulfil the schedules pays additional costs for the imbalanced energy, or receives lower payment for the energy supplied above the schedules.
- The Market Operator is responsible for calculation of these payments – on the basis of data provided by the TSO – as well as for the whole settlement procedures in this process.

SLOVENIAN BALANCING GROUP MODEL Cont.

- Balance groups can use balancing energy **abroad** by using capacity allocated via auctions.
- Reserving of capacity in advance for balancing purposes is in principle not possible.
- Only the TSO can use the reliability margin for using the balancing energy contracted via auctions for tertiary reserve outside the Slovenian power system.